SR 95 Corridor Profile Study

JUNCTION I-8 TO JUNCTION I-40

ADOT Work Task No. MPD-041-15

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DRAFT WORKING PAPER 3: CORRIDOR PERFORMANCE GOALS AND OBJECTIVES

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LIST OF ACRONYMS AND ABBREVIATIONS

ABBREVIATION	NAME
ADOT	Arizona Department of Transportation
BI	Bridge Index
FI	Freight Index
BqAZ	Building a Quality Arizona
LHMPO	Lake Havasu Metropolitan Planning Organization
MPD	Multimodal Planning Division
MPO	Metropolitan Planning Organization
I	Interstate
LRTP	Long Range Transportation Plan
PI	Pavement Index
P2P Link	Planning to Programming Link
POE	Port-of-Entry
SI	Safety Index
SR	State Route
TTTI	Truck Travel Time Index
TPTI	Truck Planning Time Index
UPRR	Union Pacific Railroad
WACOG	Western Arizona Council of Governments
YCAT	Yuma County Area Transit
YMPO	Yuma Metropolitan Planning Organization
YPG	Yuma Proving Ground

1 INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this Corridor Profile Study of State Route 95 (SR 95) between Interstate 8 (I-8) in Yuma and Interstate 40 (I-40) north of Lake Havasu City. This study will look at key performance measures relative to the SR 95 corridor, and the results of this performance evaluation will be used to identify potential strategic improvements.

ADOT is conducting eleven Corridor Profile Studies. The eleven corridors are being evaluated within three separate groupings.

The first three studies (Round 1) began in spring 2014, and encompass:

- I-17: SR 101L to I-40
- I-19: Mexico International Border to I-10
- I-40: California State Line to I-17

The second round (Round 2) of studies, initiated in spring 2015, includes:

- I-8: California State Line to I-10
- I-40: I-17 to the New Mexico State Line
- SR 95: I-8 to I-40

The third round (Round 3) of studies, to be initiated in fall 2015, includes:

- I-10: California State Line to SR 85 and SR 85: I-10 to I-8
- I-10: SR 202L to the New Mexico State Line
- SR 87/SR 260/SR 377: SR 202L to I-40
- US 60/US 70: SR 79 to US 191 and US 191: US 70 to SR 80
- US 60/US 93: Nevada State Line to SR 303L

The studies under this program will assess the overall health, or performance, of the state's strategic highways. The Corridor Profile Studies will identify candidate projects for consideration in the Multimodal Planning Division's (MPD) Planning to Programming (P2P) project prioritization process, providing information to guide corridor-specific project selection and programming decisions.

SR 95, I-8 to I-40, depicted in **Figure 1**, is one of the strategic statewide corridors identified and is the subject of this Corridor Profile Study.

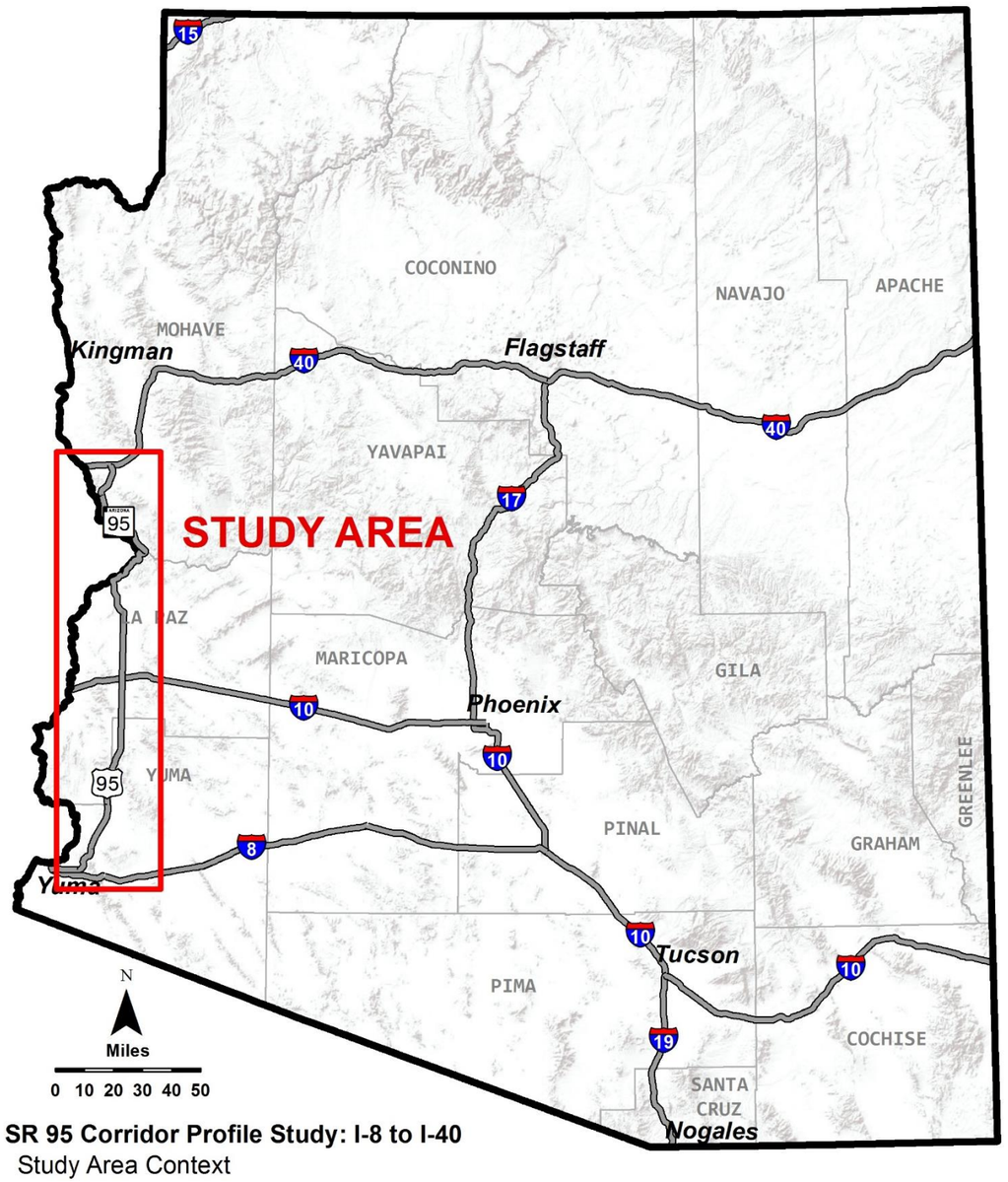


Figure 1: Corridor Study Area

1.1 Corridor Study Purpose

The purpose of the SR 95 Corridor Profile Study is to measure corridor performance to inform the development of strategic solutions that are cost-effective and account for potential risks. This purpose can be accomplished by following the process established by the previous Round 1 corridor profile studies to:

- Inventory past improvement recommendations.
- Define corridor goals and objectives.
- Assess existing performance based on quantifiable performance measures.
- Propose various solutions to improve corridor performance.
- Identify specific projects that can provide quantifiable benefits in relation to the performance measures.
- Prioritize projects for future implementation.

1.2 Corridor Study Goals and Objectives

The objective of this study is to identify a recommended set of prioritized potential projects for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The SR 95 Corridor Profile Study will define solutions and improvements for SR 95 that can be evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance.

The following goals have been identified as the desired outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals.
- Develop solutions that address identified corridor needs based on measured performance.
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure.

1.3 Working Paper 3 Overview

The purpose of Working Paper 3 is to establish the context of the SR 95 corridor, summarize the results of the corridor performance, and develop goals, objectives, and emphasis areas for the corridor.

The framework for measuring performance is based upon the five performance areas used to characterize the health of the SR 95 corridor: pavement, bridge, mobility, safety, and freight. The product of Working Paper 3 is the development of performance goals and objectives for SR 95 against which baseline performance can be evaluated. Differences between baseline performance and performance goals and objectives provide the framework for defining corridor needs in the investment areas of preservation, modernization, and expansion.

1.4 Corridor Overview

The SR 95 corridor is a vital road link in the western part of the state, providing the only north-south link between I-8, I-10, and I-40. The US 95 portion of the SR 95 corridor runs between I-8 and I-10 and connects the cities of Yuma and Quartzsite while also providing a strategic connection to the U.S. Army Yuma Proving Ground (YPG) and General Motors Desert Proving Ground – Yuma. The SR 95 portion of the SR 95 corridor runs between I-10 and I-40 and connects the cities of Quartzsite, Parker, and Lake Havasu City. This corridor also serves and passes through the Colorado River Indian Reservation.

1.5 Study Location and Corridor Segments

The study area consists of segments of both SR 95 and US 95, however, for the purposes of this study, the study area is generally referred to as SR 95, except where noted in reference to a specific project. The SR 95 study corridor has been divided into 13 segments to allow for an appropriate level of detailed needs analysis, performance evaluation, and comparison between different segments of the corridor. These segments are shown in **Figure 2** and described in **Table 1**.

Table 1: SR 95 Corridor Segments

Segment Number and Name	Segment Begin/End Description	Begin Milepost	End Milepost	Length (miles)	Number of Through Lanes	2013 Average Annual Daily Traffic Volumes	Character Description
95-A	I-8 to west of Araby Road	24	29	5	4	15,353	Non-ADOT facility (turned back to City of Yuma), traffic interchange (TI) with I-8; this Segment A will not be analyzed within the SR 95 Corridor Profile Study. Segment A is identified as it is a critical connection to I-8
95-1 (Yuma)	West of Araby Road to East of Avenue 11E	29	34	5	4	11,432	Beginning-point of ADOT facility, interrupted flow facility with four-lane cross-section, relatively flat terrain, transitioning urban/rural area, junction with Araby Road and Fortuna Road, private land ownership
95-2	East of Avenue 11E to south of Imperial Dam Road	34	42	8	2	7,221	Uninterrupted flow facility with a two-lane cross-section, rolling terrain, rural, Bureau of Land Management (BLM), Bureau of Reclamation (BOR)
95-3	South of Imperial Dam Road to Yuma Proving Ground Area	42	60	18	2	3,292	Uninterrupted flow facility with two-lane cross-section, flat terrain, rural, military land ownership (Laguna Army Airfield, YPG), General Motors Desert Proving Ground Yuma, junction with Imperial Dam Road
95-4	Yuma Proving Ground Area	60	80	20	2	1,584	Uninterrupted flow facility with two-lane cross-section, relatively flat terrain, rural, BLM, Kofa National Wildlife Refuge, military land ownership
95-5	Yuma Proving Ground Area to Quartzsite Area	80	104	24	2	1,750	Uninterrupted flow facility with two-lane cross-section, flat terrain, BLM, Kofa National Wildlife Refuge
95-6 (Quartzsite)	Quartzsite Area	104	111	2.5*	4	9,917	Interrupted flow with five-lane cross-section, urban area type within Quartzsite, private land ownership, BLM, State Trust land, junction with I-10, transition from US 95 to SR 95
95-7	Quartzsite Area to SR 72	111	131	20	2	2,357	Uninterrupted flow facility with two-lane cross-section, flat terrain, rural, BLM, State Trust Land
95-8	SR 72 to Parker Area	131	142	11	2	5,728	Uninterrupted flow facility with two-lane cross-section, flat, rural, BLM, State Trust land, Tribal land, junction with SR 72
95-9 (Parker)	Parker and Cienega Springs Area	142	149	7	4	12,349	Interrupted flow with five-lane cross-section, relatively flat with some grade variation, urban area type within Parker to Cienega Springs, private land ownership, Tribal land
95-10	Parker and Cienega Springs Area to Bill Williams Area	149	162	13	2	5,406	Uninterrupted flow facility with cross-sections varying from two lanes to four lanes, mountainous terrain, rural with some communities within the vicinity of the corridor, State Trust land
95-11	Bill Williams River to Lake Havasu City Area	162	176	14	2	5,127	Uninterrupted flow facility with two-lane cross-section, mountainous terrain, rural, BLM, U.S. Fish and Wildlife Service, State Trust land
95-12 (Lake Havasu City)	Lake Havasu City Area	176	190	14	4	17,771	Interrupted flow facility with five-lane cross-section, flat terrain, urban area type within Lake Havasu City and Desert Hills, private land ownership, State Trust land
95-13	Lake Havasu City Area to I-40	190	202	12	2	7,886	Uninterrupted flow facility with cross-sections varying from two lanes to four lanes, rolling hills terrain, rural, BLM, junction with I-40

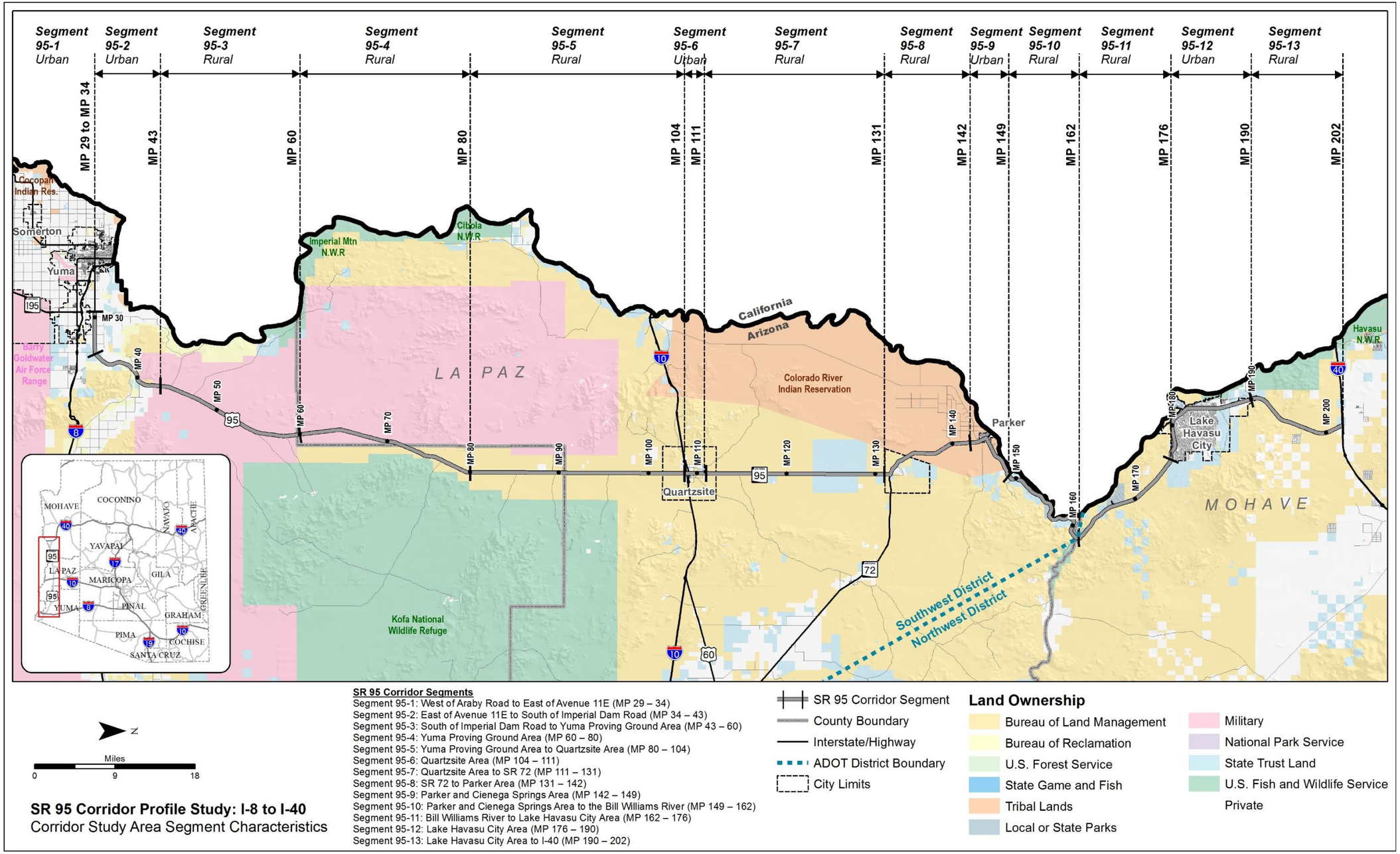


Figure 2: Study Area and Segmentation Map

2 CORRIDOR FUNCTIONALITY

The SR 95 corridor is an important travel corridor in the western part of the state. The corridor functions as a route for agricultural, military, recreational, tourist, and regional traffic. The corridor provides critical connections between the communities it serves and the rest of the regional and interstate network. The critical nature of the facility is magnified when crashes or rainfall events close the road for any length of time as alternate routes are limited.

2.1 National Context

The SR 95 corridor is the only continuous north-south state highway corridor that connects the three Arizona east-west interstate routes of I-8, I-10, and I-40. It is a strategic transportation link across western Arizona for freight and intercity travel.

2.2 Regional Connectivity

SR 95 is Arizona's westernmost north/south transportation corridor. The SR 95 corridor is located in two ADOT Districts (Southwest and Northwest); three planning areas (Yuma Metropolitan Planning Organization (YMPO), Lake Havasu Metropolitan Planning Organization (LHMPO), and Western Arizona Council of Governments (WACOG)); and three counties (Yuma, La Paz, and Mohave).

Within the corridor study limits, SR 95 offers connections to several major roadways, including I-40, I-8, I-10, SR-72, and SR 195. This highway provides access to tourist attractions, passes through the Colorado River Indian Reservation, and serves Arizona cities including Yuma, Quartzsite, Parker, and Lake Havasu City. Smaller communities that are linked by SR 95 include Fortuna, Blaisdell, Kinter, Cienega Springs, Parker Dam, and Desert Hills.

2.3 Truck Traffic

Communities along the SR 95 corridor are dependent on SR 95 to access the state economy through freight deliveries and travel to other locations. SR 95 is experiencing increasing freight flows from both domestic and international sources. Freight traffic (trucks) comprise from 15 percent to approximately 34 percent of the total traffic flow on SR 95, with the highest truck percentages at the northern end of the corridor. The SR 95 corridor is relatively close to state ports-of-entry (POE) on I-8 and on 4th Avenue in Yuma, on I-10 near Ehrenberg, and on I-40 near Topock, as well as the federal POE at San Luis. There is also a closed state POE in Parker near SR 95 that ADOT is planning on refurbishing and reopening in the future.

The Union Pacific Railroad (UPRR) Sunset Route crosses east-west in the vicinity of SR 95 in the Yuma area. The UPRR system carries significant amounts of freight between Southern California and El Paso, Texas. The Sunset Route crosses southern Arizona in an east-west direction through Yuma, Wellton, Gila Bend, Maricopa, Casa Grande, Eloy, Marana, Tucson, Benson and Willcox. In the Yuma area, two spurs serve the Yuma Proving Grounds and Yuma International Airport, which includes the Marine Corps Air Station – Yuma. UPRR ships metallic ores from Arizona and carries ten million tons of coal per year to power plants in the state[1].

The San Luis International Border Crossing is located less than 25 miles south of the City of Yuma via US 95. In 2014, this was the third busiest entry in terms of total number of loaded truck containers processed, accounting for approximately 8% of all international truck crossings within the State. The San Luis International Border Crossing was also the second busiest crossing when looking at personal vehicles and total pedestrians and accounted for 36% of all personal vehicle crossings (Bureau of Transportation Statistics, 2015). The San Luis POE services US 95, I-8, SR 195 and Mexico Federal Highway 2. The POE consists of two facilities. The primary check point facility includes six general lanes and two SENTRI[2] Lanes. A second 80-acre commercial vehicle check point facility was recently constructed five miles east of the original POE and is designed to process 150 trucks per day with the potential to expand to 650 trucks by 2030.

There is a significant amount of military-related truck traffic in the Yuma region and along the SR 95 corridor with SR 95 bisecting YPG.

2.4 Commuter Traffic

A majority of the commuter traffic along SR 95 occurs within the urbanized areas of Yuma, Parker, Quartzsite, and Lake Havasu City. These areas are economic centers along what is considered mostly a rural state route. According to the most recent traffic volume data maintained by ADOT, traffic volumes range from approximately 1,600 vehicle per day in area near the Yuma Proving Ground to approximately 18,000 vehicles per day in the Lake Havasu City area.

[1] Source: Arizona State Rail Plan (2011), page A-11.
[2] Secure Electronic Network for Travelers Rapid Inspection

According to the 2013 American Community Survey data from the US Census Bureau, 77% of the workforce in both the Yuma region and the Lake Havasu City region relies on a private vehicle to get to work.

2.5 Recreation and Tourism

SR 95 provides access to many Arizona attractions such as state parks, environmental preserves, and other recreational activities.

SR 95 provides access to the Colorado River and Parker Dam area, which have an abundance of recreational activities, such as fishing, camping, swimming, boating, and wildlife viewing. SR 95 provides direct access to three state parks: River Island, Buckskin Mountain State Park, and Lake Havasu State Park. It provides access to SARA (Special Activities and Recreation Area) Park, which is an 1,100 regional park in Lake Havasu City that includes hiking trails, mountain bike trails, dog park, BMX and Motocross track, baseball and softball fields, Havasu 95 Speedway, a remote-control plane field, and a shooting and archery range. SR 95 also provides access to the La Paz County Park.

SR 95 provides access to the Kofa National Wildlife Refuge, the second largest wilderness area in Arizona. Other recreational destinations accessible from SR 95 include Lake Havasu (via SR 95), Las Vegas (via US 93), and Quartzsite, which has numerous gem and mineral shows that attract over a million visitors per year during the months of January and February.

2.6 Multimodal Uses

2.6.1 Transit

Fixed-route and demand-responsive transit services are provided in Yuma, through the Yuma County Area Transit (YCAT) service. Quartzsite Transit Service provides local and regional transit service for elderly and persons with disabilities in the Quartzsite area. La Paz County Transit provides service to seniors and disabled throughout La Paz County. Havasu Area Transit provides demand-responsive transit for elderly and disabled people in the Lake Havasu City area. Greyhound provides intercity passenger bus services in Yuma and Quartzsite with connections to Phoenix and Southern California.

A Greyhound bus terminal is located approximately 2.5 miles away.

2.6.2 Bicycle and Pedestrian

Opportunities for bicycle and pedestrian travel are limited on SR 95. Bicycle traffic is permitted on the SR 95 mainline shoulder; however, shoulder widths are relatively narrow and generally less than a preferred 4-foot minimum.

There is a shared use path in Lake Havasu City that runs along one side of SR 95 and crosses SR 95 four times.

2.6.3 Rail

The Amtrak train station in Yuma is served by the Sunset Limited and Texas Eagle Routes. Intermodal connections include

2.6.4 Aviation

A number of airports are located in proximity to the SR 95 corridor. These include the Yuma International Airport, Avi Suquilla Airport, which is operated by the Colorado River Indian Tribes, and the Lake Havasu City Airport.

2.7 Traveler Amenities

There is a dynamic message sign used for traveler information on SR 95 south of Parker, Arizona. No rest areas are located on this corridor. The corridor does include a number of viewing turnouts, particularly through the Colorado River area.

2.8 Land Use, Ownership, and Jurisdictions

As shown in the previously referenced Figure 2, the corridor traverses multiple jurisdictions and land holdings located in three Arizona counties: Mohave, La Paz, and Yuma. The western terminus of SR 95 is within the City of Yuma, and ownership is primarily private. The land ownership between approximately milepost 40 and milepost 130 is primarily owned by BLM.

North of Yuma, a large area of the corridor is surrounded by YPG, BLM land, and the Kofa National Wildlife Refuge, which is located in the vicinity of the corridor to the east. In the Quartzsite area, there is private land ownership, and north of Quartzsite there is a mix of primarily BLM land as well as State Trust Land. Near Parker, the Colorado River Indian Tribes has Reservation lands on both sides of SR 95. Between Parker and Lake Havasu City, there is a mix of State Trust land, BLM land, and some state park land. In the Lake Havasu area, there is primarily land under private ownership. Between Lake Havasu City and I-40, the land is primarily owned by BLM with some State Trust land and some limited private lands.

2.8.1 Population Centers

Population centers of various sizes exist along the SR 95 corridor. **Table 2** provides a summary of the 2010 U.S. Census populations for communities along SR 95. In comparison to 2000 population estimates, Lake Havasu City and the City of Yuma have recorded the highest 2000-2010 growth in population with increases of 25% and 16.5%, respectively.

Strong growth in population is expected to continue in Yuma, Quartzsite, and Lake Havasu City. According to the Arizona State Demographer's Office, the Yuma population is forecasted to reach 133,431 in 2035, which represents 43% growth compared to the 2010 population, while the Lake Havasu City population is forecasted to reach 65,626 in 2035, which represents 25% growth compared to the 2010 population. Quartzsite is also expected to grow from a population of 3,677 persons to 5,532 persons in 2035, or a growth of 50%.

Table 2: Population Growth along the SR 95 Corridor

Community	2010 Population	2015 Population	2035 Population	Percent Change, 2010-2035
Yuma	93,064	96,327	133,431	43.4%
Quartzsite	3,677	3,952	5,532	50.4%
Parker	3,083	3,039	3,060	-0.7%
Lake Havasu City	52,527	53,714	65,626	24.9%
Colorado River Indian Reservation (Arizona area)	7,077	7063	6934	-2.02%

Source: https://population.az.gov/population-projections, 2013-2050 Sub-County Population Projections

2.8.2 Major Traffic Generators

The cities of Yuma and Lake Havasu City are major traffic generators in the region. Yuma is a regional center with connections to Arizona and California via SR 95 and I-8. SR 95 also provides access to SR 195, a limited access state highway that enhances the movement of goods and freight between the San Luis POE and I-8 for commercial vehicles.

2.9 Wildlife Linkages Considerations

The Arizona State Wildlife Action Plan (SWAP) provides a 10-year vision for the entire state, identifying wildlife and habitats in need of conservation, insight regarding the stressors to those resources, and suggests actions that can be taken to alleviate those stressors. Using the Habimap Tool (http://azgfdportal.az.gov/wildlife/actionplan) that creates an interactive database of the information included in the SWAP, the following were identified in relation to the SR 95 corridor:

- Wildlife waters exist to the east and west of the SR 95 corridor south of I-10. Other wildlife waters are scattered near SR 95 north of Parker to I-40.
- The SR 95 corridor travels through allotments controlled by the Arizona State Land Department and the Bureau of Land Management.
- Potential Arizona Wildlife Linkage Zones exist along SR 95 in six areas that include MP 36 to MP 43, MP 71 to MP 100, MP 118 to MP 124, MP 133 to MP 138, MP 169 to MP 173, and MP 186 to MP 198.
- According to the Species and Habitat Conservation Guide, sensitive habitats that have moderate conservation potential exist along the SR 95 corridor. These areas are located within the vicinity of the Gila River, south of I-10 both east and west of SR 95, north of Parker around Buckskin Mountain State Park, and east of SR 95 from Lake Havasu to I-10.
- Areas where Species of Greatest Conservation are the moderately vulnerable are similar to the areas identified in the Species and Habitat Conservation Guide (see above).
- Identified areas of moderate level of Species of Economic and Recreational Importance are in the vicinity of the Gila River, Buckskin Mountain State Park, Lake Havasu, east of SR 95 from Lake Havasu City to I-10.

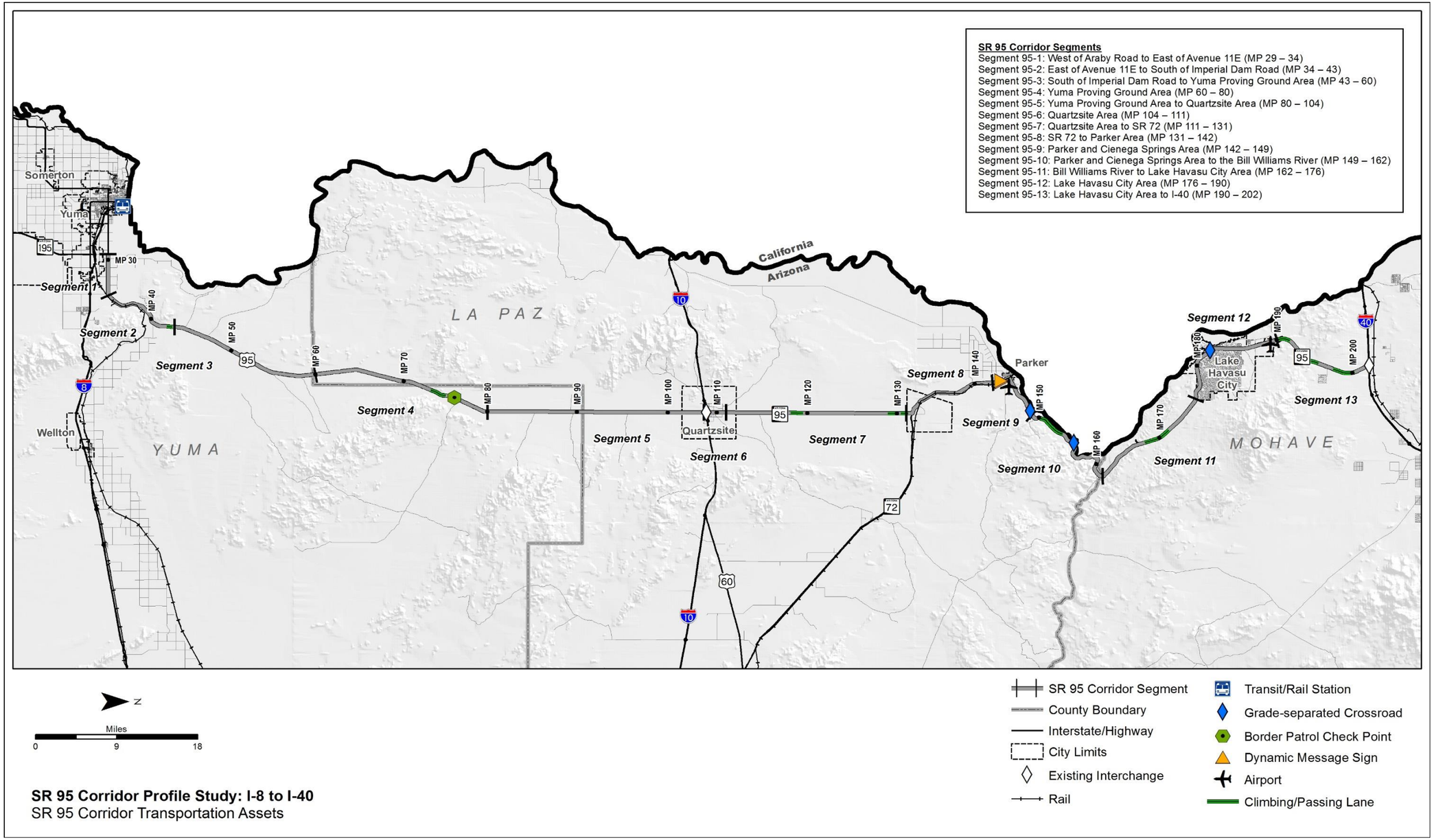
2.10 Corridor Transportation Assets

Corridor transportation assets are summarized in **Figure 3**. Climbing and passing lanes are located primarily in the northern area of the corridor, between Parker and I-40. In this area there are five passing lane areas. South of Parker, there are four passing lane areas. There is a Border Patrol Check Point located at approximately milepost 76.

The corridor includes two traffic interchanges: one interchange is with I-10 at Quartzsite while the other interchange is located at I-40 at the northern terminus of the corridor. There are three grade-separated crossroads: one located in the Lake Havasu area (McCulloch Boulevard at milepost 182.4) and two located northeast of Parker, at approximately milepost 148.5 (Rio Vista Road) and milepost 154.1 (Buckskin Trail).

2.11 Conclusion of Corridor Characteristics

The SR 95 Corridor is the only north-south transportation route in the western part of the state that connects to three interstate routes: I-8, I-10, and I-40. The corridor functions as a route for agricultural, military, recreational, tourist, and regional traffic. Seasonal traffic is a consideration on this route, as traffic increases significantly during the winter months, particularly in the Yuma, Quartzsite, Lake Havasu City, and Parker areas. Multimodal travel options are very limited along the SR 95 corridor. Population is anticipated to grow significantly in the Yuma, Quartzsite and Lake Havasu areas in the future.



SR 95 Corridor Profile Study: I-8 to I-40

Figure 3: SR 95 Corridor Transportation Assets

3 SUMMARY OF CORRIDOR PERFORMANCE

3.1 Summary of Performance Areas

A system to establish baseline corridor performance was developed through a collaborative process with ADOT, the Technical Advisory Committee (TAC) and the Corridor Teams for the profile studies. Baseline performance was evaluated using primary and secondary performance measures to define the corridor health and identify locations warranting further analysis to define needs. Corridor needs constitute the difference in baseline corridor performance compared to performance objectives.

The performance system consists of five areas: Pavement, Bridge, Mobility, Safety, and Freight. For each of these performance areas, a primary measure – known as the Index – was defined along with a set of secondary measures that allows for a more detailed analysis of corridor performance. **Table 3** lists the primary and secondary measures that were evaluated for each of the five performance areas.

Table 3: Corridor Performance Measures

Performance Index	Primary Measures	Secondary Measures
Pavement	**Pavement Index** (based on a combination of International Roughness Index and Cracking)	• Directional Pavement Serviceability • Pavement Area Failure • Pavement Hot Spots
Bridge	**Bridge Index** (based on Deck Rating, Substructure Rating, or Superstructure rating)	• Bridge Sufficiency Rating • Functionally Obsolete • Lowest Bridge Rating • Bridge Hot Spots
Mobility	**Mobility Index** (based on combination of Current V/C and Future V/C)	• Existing Directional Peak Hour Volume/Capacity (V/C) • Future V/C • Directional Travel Time Index (TTI) • Directional Planning Time Index (PTI) • Road Closure Frequency • Percent Non-Single Occupancy Vehicle Trips • Bicycle Accommodation
Safety	**Safety Index** (based on frequency of fatal and incapacitating injury crashes)	• Percent Strategic Highway Safety Plan Emphasis Areas • Crash Unit Types • Directional Safety Index • Safety Hot Spots
Freight	**Freight Index** (based on Truck Planning Time Index)	• Directional Truck Travel Time Index (TTTI) • Directional Truck Planning Time Index (TPTI) • Road Closure Duration • Clearance Restrictions

Working Paper 2 evaluated the overall corridor performance (as a weighted average by segment length) and individual segment performance in the five aforementioned areas. The primary and secondary performance measures were quantified where feasible. A scale for each measure was developed based on adopted ADOT thresholds, where applicable, or on statistical analysis of statewide datasets. The scaling is split into three levels, each of which is represented by a corresponding color. The scale levels are named “good” (green), “fair” (yellow), and “poor” (red), except that for measures based on a comparison to statewide averages (e.g., the Safety performance area) where the levels are called “above average” (green), “average” (yellow), and “below average” (red). Some of the secondary measures are “hot spots” that cannot be readily quantified at a segment or overall corridor level, so no scaling was developed for “hot spots”.

Good / Above Average Performance
Fair / Average Performance
Poor / Below Average Performance

The corridor weighted average ratings are summarized in **Figure 4**, which also provides a brief description of each performance measure. **Figure 5** shows the corridor and segment performance for each primary measure. The following sub-sections summarize the measured performance in each performance area according to the analysis findings documented in Working Paper 2.

3.2 Pavement

The weighted average of the Pavement Index indicates “good” overall pavement conditions for the SR 95 corridor. Segment 13 has “poor” Pavement Index and % Area Failure ratings of 2.77 and 24.7%, respectively. Segment 6 and Segment 8 have “fair” Pavement Index ratings. Segment 3 and Segment 6 both have “poor” % Area Failure ratings of more than 30%. There are several pavement hot spots that exist in Segments 3, 6, 7, 8, 9, 12, and 13.

3.3 Bridge

All segments that contain bridges have a “fair” Bridge Index except Segments 1 and 9, which have a “good” Bridge Index. There are two functionally obsolete bridges (in Segment 2 and Segment 12). There are two bridge hot spots, which are located in Segments 8 and Segment 12.

3.4 Mobility

The weighted average of the Mobility Index indicates “good” overall mobility conditions for SR 95 with Segment 12 (Lake Havasu City segment) indicating “fair” conditions. During the existing peak hour, traffic operations are “good” for all segments. Segment 12 is anticipated to have “poor” performance in the future, according to the Future V/C performance measure.

The TTI measure indicates that the SR 95 segments generally have “good” performance. Segment 12 within Lake Havasu City has the highest TTI. The PTI measure indicates many of the SR 95

segments, both northbound and southbound, have “fair” or “poor” performance in terms of reliability. Segments 4, 6, 9, and 12 have the least reliable travel time.

More than half of SR 95 segments show “poor” or “fair performance for non-SOV trips, indicating single occupant trips are more common. Overall, the corridor’s weighted average performance regarding non-SOV trips is “fair”. Segments 9 and 12 have “fair” performance in the closure duration performance measure. The overall weighted average for closures shows “good” performance for the corridor. Overall, the SR 95 corridor has “poor” performance for accommodating bicycle travel along SR 95.

3.5 Safety

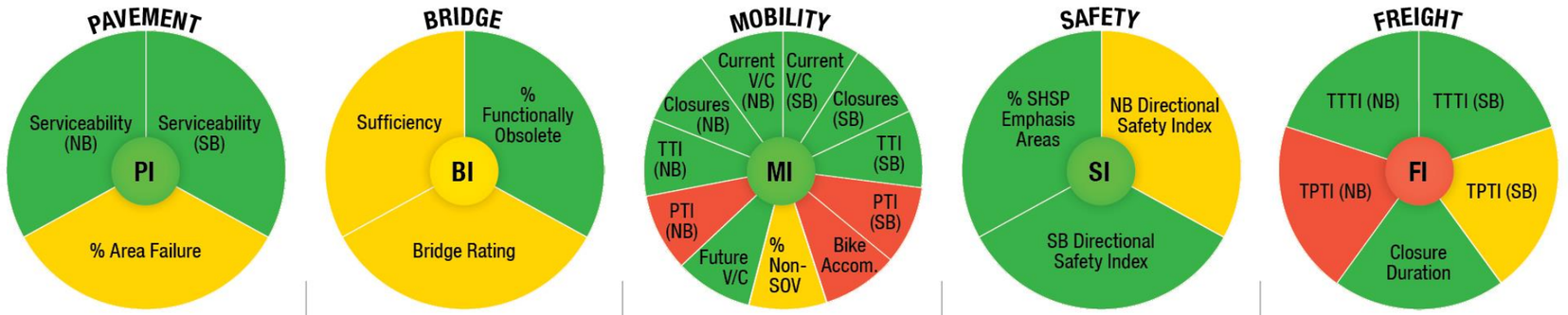
The Safety Index for the overall SR 95 corridor is below the statewide average for similar operating environments, meaning the corridor has “above average” performance. This means SR 95 has fewer fatal and incapacitating injury (F+I) crashes than the statewide average for other similar operating environments. The safety performance evaluation utilized two operating environments for the analysis. The operating environments for SR 95 include 2 or 3 Lane Undivided Highway segments (rural sections) and 4 or 5 Lane Undivided Highway segments (urban sections). The examination of five-year crash data (2010-2014) shows that there were 10 fatal crashes and 100 incapacitating injury crashes in the urban areas. In the rural areas, there were 14 fatal crashes and 35 incapacitating injury crashes.

A high concentration of F+I crashes were observed in the Lake Havasu City area (Segment 12; refer to Figure 2). Five segments (2, 4, 6, 11, and 12) rated “below average” in terms of performance for the Safety Index, indicating that the segments have more F+I crashes than the statewide average for similar operating environments.

3.6 Freight

The performance of freight mobility for SR 95, according to the Freight Index, is overall “poor”. The freight index is based on the overall TPTI. Most of the SR 95 segments have a “good” performance rating in terms of the directional TTTI measure, which indicates that little to none recurring congestion is experienced on SR 95. The overall weighted average of the directional TPTI measure indicates that the corridor has “poor” travel time reliability in the northbound direction and “fair” travel time reliability in the southbound direction due to non-recurring congestion. Seven of the thirteen segments were identified as having “poor” performance in terms of the TPTI measure. The performance measure for the closure duration along the SR 95 segments indicates “good” performance overall. No vertical clearance restrictions exist along the SR 95 corridor.

SR 95 Corridor Performance Study (all performance measures are weighted averages for all segments of the corridor) GOOD FAIR POOR



Pavement Index (PI): based on two pavement condition ratings from the ADOT Pavement Database. The two ratings are the International Roughness Index (IRI) and the Cracking Rating. The calculation of the Pavement Index uses a combination of these two ratings.

» **Directional Pavement Serviceability** - the weighted average (based on number of lanes) rating which measures the condition of the pavement in each direction of travel.

» **% Pavement Failure** - the percentage of pavement area that is rated above the failure thresholds for IRI or Cracking, as established by ADOT Materials Group (IRI > 105 or Cracking > 15)

Bridge Index (BI): based on four bridge condition ratings from the ADOT Bridge Database. The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating.

» **Sufficiency** - indicative of bridge sufficiency to remain in service. The factors that contribute to the Sufficiency Rating include structural adequacy and safety, serviceability and functional obsolescence, and essentiality for public use.

» **% Functionally Obsolete** - indicative of the percentage of deck area on bridges that is no longer functionally adequate for its current use, such as a lack of shoulders or the inability to handle current traffic volumes. Functionally Obsolete does not directly relate to the structural adequacy.

» **Bridge Rating** - identifies the lowest bridge rating on each segment.

Mobility Index (MI): an average of the current volume-to-capacity (V/C) ratio and the projected 2035 V/C ratio.

» **Current V/C** - the existing peak hour V/C ratio in both directions of the corridor. This measure provides an understanding of the directional operating characteristics of the corridor during the existing peak hour from a mobility and congestion standpoint.

» **Future V/C** - a measurement of the future 2035 V/C ratio that identifies how the corridor will operate in the future from a mobility and congestion standpoint.

» **Directional Closures** - the average number of times a given location in the corridor was closed per mile in a specific direction of travel per year.

» **Travel Time Index (TTI)** - the ratio of the average peak period travel time to the free-flow travel time. The TTI represents recurring delay along the corridor.

» **Directional Planning Time Index (PTI)** - the ratio of total travel time needed for 95 percent on-time arrival to free-flow travel time. The PTI represents non-recurring delay along the corridor.

» **% Non-single Occupancy Vehicle Trips (Non-SOV)** - represents the percentage of trips that are taken by vehicles carrying more than one occupant.

» **Bicycle Accommodation** - represents the percentage of roadway that is accommodating for bicycle travel.

Safety Index (SI): combines the bi-directional frequency and rate of fatal and incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona.

» **% SHSP Emphasis Area** - the percentage of fatal and incapacitating crashes that involve at least one of the five Strategic Highway Safety Plan (SHSP) Emphasis Areas.

» **% Truck Crashes** - the percentage of fatal and incapacitating crashes that involve a truck.

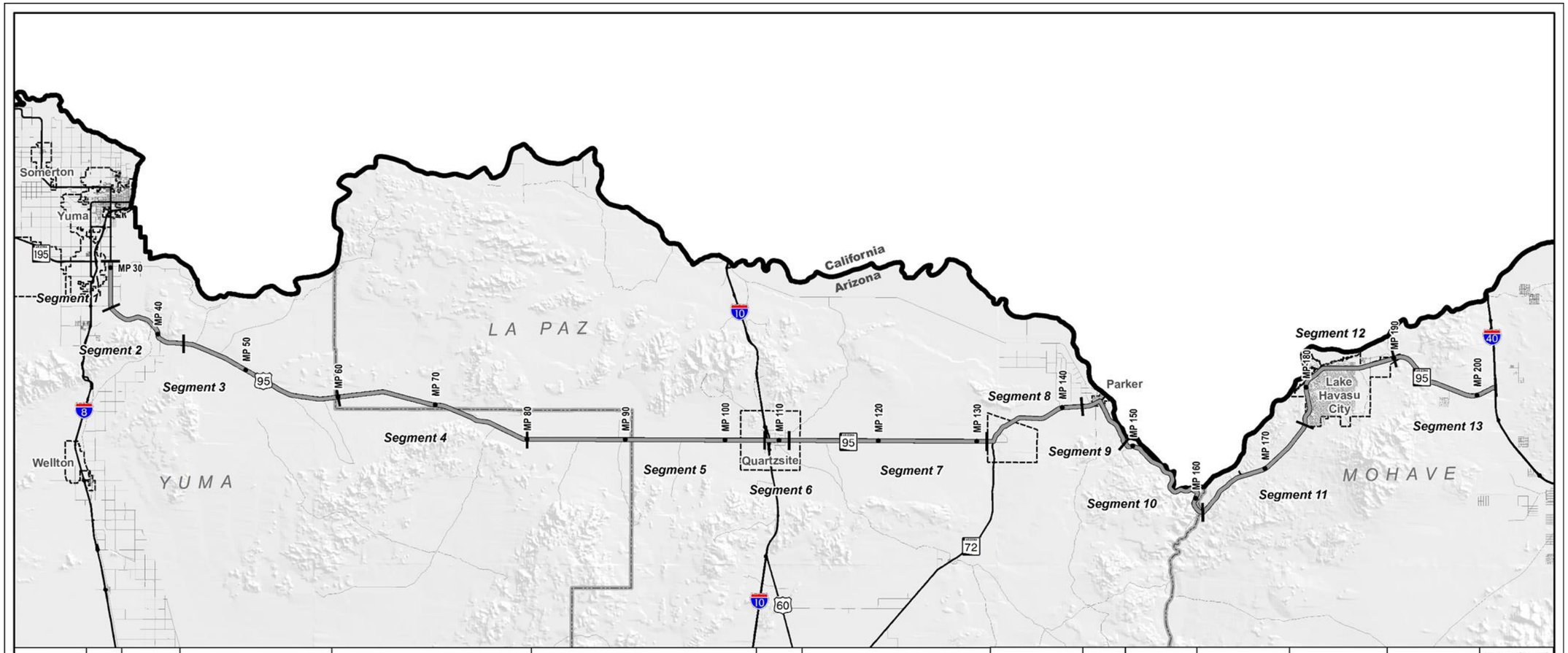
Freight Index (FI): a reliability performance measure based on the bi-directional planning time index for truck travel.

» **Directional Truck Planning Time Index (TPTI)** - the ratio of total travel time (for trucks only) needed for 95 percent on-time arrival to free-flow travel time. The TTPI represents non-recurring delay along the corridor.

» **Directional Truck Travel Time Index (TTTI)** - the ratio of the average peak period travel time (for trucks only) to the free-flow travel time. The TTTI represents recurring delay that occurs along the corridor.

» **Closure Duration** - the average time a given location in the corridor was closed per mile per year.

Figure 4: Corridor Performance Summary



	95-1	95-2	95-3	95-4	95-5	95-6	95-7	95-8	95-9	95-10	95-11	95-12	95-13	Weighted Average
Pavement	3.54	3.82	3.61	4.41	4.14	3.27	3.68	3.39	3.59	3.62	4.13	3.77	2.77	3.65
Bridge	6.00	6.00	5.00	No Bridges	No Bridges	6.00	6.00	5.00	6.76	6.25	No Bridges	5.46	No Bridges	5.72
Mobility	0.43	0.31	0.10	0.12	0.12	0.48	0.16	0.32	0.57	0.21	0.16	0.78	0.22	0.24
Safety	1.13	1.29	0.06	1.48	0.69	1.40	0.00	0.14	0.93	0.63	1.95	1.59	1.06	0.84
Freight	0.31	0.64	0.76	0.13	0.74	0.35	0.70	0.53	0.24	0.78	0.73	0.22	0.37	0.53

Figure 5: SR 95 Corridor Performance Index Summary

4 CORRIDOR PERFORMANCE GOALS AND OBJECTIVES

Corridor performance goals and objectives for SR 95 were developed based on discussions with stakeholders within the corridor. The corridor performance goals are:

- Support goals identified in the *What Moves You Arizona* Long-Range Transportation Plan (LRTP)
- Improve mobility and connectivity.
- Provide a safe and reliable route for recreation and tourist travel.
- Provide safe, reliable and efficient connection to all communities along the corridor to permit efficient regional travel.
- Provide a safe, reliable and efficient freight route between I-8, I-10, and I-40.
- Maintain and preserve highway infrastructure.
- Provide a safe and reliable route for all users.

Statewide goals and performance measures were established by the ADOT LRTP through an extensive outreach program. The statewide goals relevant to the SR 95 performance framework areas have been identified as part of Working Paper 3 efforts and coordinated with the corridor goals formulated for the five performance areas.

Specific objectives have been developed for the SR 95 corridor to meet these performance goals, as detailed below:

- Maintain acceptable levels of service, particularly during seasonal peak periods.
- Reduce delays from non-recurring events (crashes, low-water crossings, flooding events) that that close the roadway.
- Improve bicycle accommodation.
- Reduce delays and restrictions to freight movement to improve reliability.
- Improve travel time reliability in the northbound direction (including impacts to motorists due to freight traffic).
- Maintain acceptable levels of pavement ride quality for all corridor users.
- Reduce fatal and serious injury crashes for all roadway users.

Table 4 shows the aligned statewide and SR 95 corridor goals along with the SR 95 corridor objectives.

4.1 Stakeholder Input

Meetings were held with the following agencies to review the performance framework, performance measures, and performance outcome, and to discuss performance goals and objectives:

- **ADOT Northwest District/WACOG/LHMPO:** This meeting was held on September 25, 2015 and included participants from the ADOT Northwest District, ADOT MPD, Lake Havasu City (representing LHMPO), WACOG, and the consultant team.
- **ADOT Southwest District/YMPO:** This meeting was held on September 28, 2015 and included participants from the ADOT Southwest District, ADOT MPD, YMPO, and the consultant team.

The meeting attendees provided the following comments with respect to the results of the performance evaluation and the development of goals and objectives for the corridor:

- The performance evaluation results for the primary and secondary performance measures, overall, are consistent with ADOT's field experience.
- There are only a couple of bridges with issues – this is due in part to the low number of bridges along SR 95. However, additional bridges are desired at major washes. Low water crossings during major storm events result in closures of the corridor that impact mobility and freight movements and create maintenance issues during storms.
- Seasonal traffic is a major concern. Peak traffic volumes, which occur during winter months, may not be completely reflected in the Mobility Performance Area. The winter months – particularly February and March – experience significant increases in traffic volumes with the arrival of seasonal residents and special events (RV Show and Gem Show), which attract high volumes of recreation vehicles traveling along SR 95.
- The "poor" PTI performance rating is consistent with District observations regarding congestion. Within Lake Havasu City (Segment 12), the congestion can be associated with traffic signals. It was noted that there is not a central traffic signal system, so traffic signal coordination may not be optimized.
- The Districts agree with the "poor" % Bicycle Accommodation performance measure rating, as shoulder widths are not to roadway design standards and/or in a condition to accommodate bicycle travel. The Districts noted that there is a large bicycle community that is increasing, especially in the northern section of SR 95 around Lake Havasu City, and they are expressing concerns about bicycle mobility and safety.
- Closures have been recognized as a mobility issues along SR 95 with the large number of low water crossings.
- Animal-related crashes are commonly occurring along SR 95, especially within the Southwest District. However, most animal-related crashes do not involve fatalities or incapacitating injuries. It was noted that the Corridor Profile Study process emphasizes locations that have demonstrated a pattern of incapacitating injury or fatal crashes.
- During peak periods (February-March), increased volumes of recreational vehicles traveling at speeds lower than the posted speed limit create safety issues.
- Shoulder widths that are not to ADOT standards are a safety concern for the Districts.
- SR 95 continues to experience an increase in trucks with oversized loads. This is due to the rerouting and detours of trucks due to height and or weight restrictions in place on other corridors.
- Inadequate shoulder widths don't allow opposing vehicles of trucks with oversized loads to move outside the lane without driving on non-shoulder conditions.
- Low water crossings impact freight movements during closures due to storms.

4.2 Performance Emphasis Areas

Based on stakeholder input, the Mobility, Safety, and Freight performance areas were identified as "emphasis areas" for SR 95. These three emphasis areas warrant more attention and focus than the other performance areas on the SR 95 corridor. As such, corridor-wide weighted average performance objectives for Mobility, Safety, and Freight are identified with a higher standard than the corridor-wide weighted average performance objectives for other performance areas.

4.3 Goals and Objectives by Performance Area

Taking into account the corridor performance goals and identified "emphasis areas", performance objectives were developed for each quantifiable performance measure that identify the desired level of performance based on the performance scale levels for the overall corridor and for each segment of the corridor. The performance objectives within each of the five performance areas are shown in **Table 4**.

The colors shown in **Table 4** represent the corresponding level of performance as described earlier, with green indicating "good" or "above average" performance, yellow indicating "fair" or "average" performance, and red indicating "poor" performance. Good/above average performance is the desired level of performance for the overall corridor primary measure for performance areas designated as "emphasis areas". Fair or average performance is the desired objective for all segments in all performance areas and for the corridor weighted average for performance areas that are not emphasis areas.

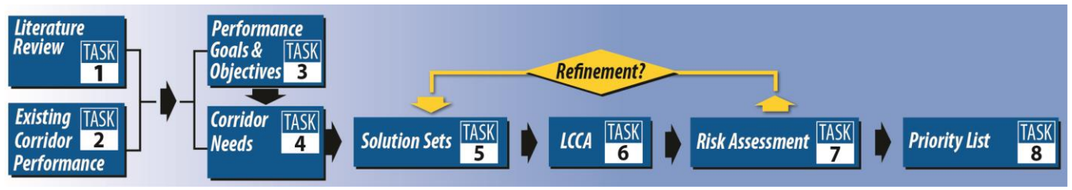
Table 4: Goals and Objectives by Performance Area

ADOT Statewide LRTP Goals	SR 95 Corridor Goals	SR 95 Corridor Objectives	Performance Area	Performance Measure	Performance Objective	
					Corridor Average	Segment
Improve Mobility and Accessibility	Improve mobility and connectivity Provide a safe and reliable route for recreation and tourist travel Provide safe, reliable and efficient connection to all communities along the corridor to permit efficient regional travel	Maintain acceptable levels of service, particularly during seasonal peak periods	Mobility (*Emphasis Area*)	Mobility Index	Good	Fair or better
				Existing Directional Peak Hour V/C		Fair or better
				Future V/C		Fair or better
				Directional Closure Frequency		Fair or better
		Reduce delays from non-recurring events (crashes, low-water crossings, flooding events) that that close the roadway		Directional Travel Time Index		Fair or better
				Directional Planning Time Index		Fair or better
				Percent Non-SOV Trips		Fair or better
		Improve bicycle accommodation		Percent Bicycle Accommodation		Fair or better
Support Economic Growth	Provide a safe, reliable and efficient freight route between I-8, I-10, and I-40	Reduce delays and restrictions to freight movement to improve reliability	Freight *(Emphasis Area)*	Freight Index	Good	Fair or better
				Directional Travel Time Index		Fair or better
		Improve travel time reliability in the northbound direction (including impacts to motorists due to freight traffic)		Directional Planning Time Index		Fair or better
				Closure Duration		Fair or better
Preserve and Maintain the State Transportation System	Maintain and preserve highway infrastructure	Maintain acceptable levels of pavement ride quality for all corridor users	Bridge	Bridge Index	Fair or better	Fair or better
				Bridge Sufficiency Rating		Fair or better
				Bridge Rating		Fair or better
				Percent Deck Area on Functionally Obsolete Bridges		Fair or better
			Pavement	Pavement Index	Fair or better	Fair or better
				Directional Pavement Serviceability		Fair or better
				Percent Pavement Area Failure		Fair or better
Enhance Safety and Security	Provide a safe and reliable route for all users	Reduce fatal and serious injury crashes for all roadway users	Safety *(Emphasis Area)*	Safety Index	Above Average	Fair or better
				Percent SHSP Emphasis Areas		Fair or better
				Directional Safety Index		Fair or better

5 NEXT STEPS

The overall Corridor Profile Study process is shown in **Figure 6**. The process consists of eight tasks where the final results will provide candidate projects for P2P prioritization and inform the LRTP Update. The next step in the SR 95 Corridor Profile Study will be to conduct a needs assessment based on the relationship between the existing performance and the desired performance (Task 4). The corridor team will compare measured performance completed in Task 2 to the Corridor Objectives and Goals identified in this Working Paper 3 (Task 3). A "need" is identified when measured performance does not meet the expected performance objective.

The next deliverable, Working Paper 4, will report the findings from a needs analysis to help identify strategic improvements. The needs analysis will take a detailed look at the available data sets for each of the primary and secondary performance measures (including the "hot spots"). Following the needs assessment, "solution sets" will be developed to address the identified needs and improve performance (Task 5).



- **Task 1** assesses work already completed in the corridor through a literature review
- **Task 2** determines existing corridor performance based on data collected for the identified performance areas (pavement, bridge, mobility, safety and freight)
- **Task 3** develops a long-term goals and objectives that define how the corridor can be expected to function, its primary purpose and performance emphasis areas
- **Task 4** determines corridor needs by comparing existing conditions to expected performance
- **Task 5** formulates solutions to raise performance levels throughout the corridor with a focus on high need areas
- **Task 6** estimates the cost of solutions using life-cycle cost analysis (LCCA) and benefit cost analysis (BCA) approaches to ensure a full understanding of the long term costs to be managed
- **Task 7** performs a risk-based assessment to ensure that the solution set selected is the most effective at enhancing corridor performance. Where necessary, solution sets can be modified to maximize their performance contribution.
- **Task 8** describes the strategic projects comprising the solution set using a Project Scoping Template

Figure 6: Corridor Profile Study Process